IN THE CLAIMS:

1. (Original) A method for enabling a server configured with a plurality of virtual servers to participate in a plurality of private network address spaces and service requests within those address spaces, the method comprising the steps of:

associating each virtual server with an IPspace having one or more addresses assigned to one or more network interfaces of the virtual server;

tagging each network interface with a first IPspace identifier (ID);

providing the virtual server with one or more routing tables that control routing operations for requests processed by the virtual server; and

applying the first IPspace ID to translation procedures that enable selection of a current virtual server context used to process an incoming request and an appropriate routing table used to process an outgoing request.

2. (Original) The method of Claim 1 wherein the server is a filer and wherein the virtual server is a virtual filer (vfiler).

3. (Original) The method of Claim 2 wherein the step of applying comprises the step of employing an incoming path translation procedure.

4. (Original) The method of Claim 3 wherein the step of employing comprises the steps of:

receiving the incoming request at the network interface, the incoming request having a destination address;

searching a list of addresses contained in an interface network structure for an address that matches the destination address of the incoming request, the interface network structure storing the first IPspace ID; and

upon finding a match, following a first pointer of the interface network structure to an interface address structure having a back link pointer that references a vfiler context structure storing a second IPspace ID.

5. (Original) The method of Claim 4 wherein the step of employing further comprises the steps of:

comparing the first IPspace ID with the second IPspace ID; and

selecting the current vfiler context to process the incoming request when the first IPspace ID matches the second IPspace ID.

6. (Currently Amended) A method for enabling a filer configured with a plurality of virtual filers to participate in a plurality of private network address spaces and service requests within those address spaces, the method comprising the steps of:

associating each virtual filer with an IPspace having one or more addresses assigned to one or more network interfaces of the virtual filer;

tagging each network interface with a first IPspace identifier (ID);

providing the virtual filer with one or more routing tables that control routing operations for requests processed by the virtual filer;

receiving the incoming request at the network interface, the incoming request having a destination address;

searching a list of addresses contained in an interface network structure for an address that matches the destination address of the incoming request, the interface network structure storing the first IPspace ID;

configuring a second pointer of a process block data structure to reference the current vfiler context to thereby qualify the request for subsequent processing in the filer;

comparing the first IPspace ID with the second IPspace ID;

upon finding a match, following a first pointer of the interface network structure to an interface address structure having a back link pointer that references a vfiler context structure storing a second IPspace ID; and

selecting the current vfiler context to process the incoming request when the first IPspace ID matches the second IPspace ID.

7. (Original) The method of Claim 6 wherein the subsequent processing comprises one of searches and boundary checks needed to verify that the vfiler is allowed to access requested storage resources.

8. (Original) The method of Claim 3 wherein the step of applying comprises the step of employing an outgoing path translation procedure.

9. (Original) The method of Claim 8 wherein the step of employing comprises the steps of:

issuing the outgoing request from a vfiler;

determining whether the request requires route calculation; and

if route calculation is required, using a routing table pointer of the current vfiler context to choose the appropriate routing table of the vfiler to process the outgoing request.

10. (Original) The method of Claim 9 wherein the step of choosing comprises the steps of:

performing a lookup operation to the appropriate routing table;

determining over which output interface the outgoing request should be forwarded; and

forwarding the request to the output interface.

11. (Original) A system adapted to enable a file server configured with a plurality of virtual servers to participate in a plurality of private network address spaces and service requests within those address spaces, the system comprising:

a network adapter including at least one network interface configured to receive an incoming request from the network and to forward an outgoing request over the network, the network interface an address and having a first IPspace identifier (ID) that binds the interface to an IPspace;

a plurality of routing tables maintained by the virtual servers to control routing operations for requests processed by the virtual servers;

an operating system comprising networking code that uses a destination address of the incoming request and the first IPspace ID to select a current virtual server to process the incoming request, the networking code further using a routing table pointer of the current virtual server to select an appropriate routing table if a routing operation is required for the outgoing request; and

a processor coupled to the network adapter and configured to execute the operating system to thereby invoke network and storage access operations in accordance with translation procedures associated with incoming and outgoing requests.

12. (Original) The system of Claim 11 wherein the file server is a filer and wherein the virtual servers are virtual filers (vfilers).

13. (Original) The system of Claim 12 wherein the operating system is a storage operating system.

14. (Original) The system of Claim 13 further comprising a memory adapted to maintain various data structures that cooperate to provide an IPspace database that stores configuration information used to select the current vfiler.

15. (Currently Amended) A system adapted to enable a file server configured with a plurality of virtual filers to participate in a plurality of private network address spaces and service requests within those address spaces, the system comprising:

a network adapter including at least one network interface configured to receive an incoming request from the network and to forward an outgoing request over the network, the network interface an address and having a first IPspace identifier (ID) that binds the interface to an IPspace;

a plurality of routing tables maintained by the virtual filers to control routing operations for requests processed by the virtual filers;

a storage operating system comprising networking code that uses a destination address of the incoming request and the first IPspace ID to select a current virtual filer to process the incoming request, the networking code further using a routing table pointer of the current virtual server to select an appropriate routing table if a routing operation is required for the outgoing request;

a memory adapted to maintain various data structures that cooperate to provide an IPspace database that stores configuration information used to select the current vfiler, where the various data structures comprise:

an interface network (ifnet) structure associated with the network interface,

an interface address (ifaddr) structure coupled to the ifnet structure and representing the address of the interface,

a vfiler context structure coupled to the ifaddr structure, and

a process block (proc) structure coupled to the vfiler context structure; and

a processor coupled to the network adapter and configured to execute the operating system to thereby invoke network and storage access operations in accordance with translation procedures associated with incoming and outgoing requests.

16. (Original) The system of Claim 15 wherein the ifnet structure includes configuration information such as a first pointer referencing the ifaddr structure for the address assigned to the network interface and the first IPspace ID of the interface.

17. (Original) The system of Claim 16 wherein the ifaddr data structure includes a back link pointer that references the vfiler context structure associated with the address.

18. (Original) The system of Claim 17 wherein the vfiler context structure contains configuration information needed to establish the current vfiler, the configuration information including a second IPspace ID and the routing table pointer.

19. (Original) The system of Claim 18 wherein the proc data structure represents a context of a process thread executing on the filer and contains a second pointer referencing the current vfiler.

20. (Original) Apparatus for enabling a filer configured with a plurality of virtual filers (vfilers) to participate in a plurality of private network address spaces and service requests within those address spaces, the apparatus comprising:

means for associating each vfiler with an IPspace having one or more addresses assigned to one or more network interfaces of the vfiler;

means for tagging each network interface with a first IPspace identifier (ID);

means for providing the vfiler with one or more routing tables that control routing operations for requests processed by the vfiler; and

means for applying the first IPspace ID to translation procedures that enable selection of a current vfiler context used to process an incoming request and an appropriate routing table used to process an outgoing request.

21. (Original) A computer readable medium containing executable program instructions for enabling a filer configured with a plurality of virtual filers (vfilers) to participate in a plurality of private network address spaces and service requests within those address spaces, the executable program instructions comprising program instructions for:

associating each vfiler with an IPspace having one or more addresses assigned to one or more network interfaces of the vfiler;

tagging each network interface with a first IPspace identifier (ID);

providing the vfiler with one or more routing tables that control routing operations for requests processed by the vfiler; and

applying the first IPspace ID to translation procedures that enable selection of a current vfiler context used to process an incoming request and an appropriate routing table used to process an outgoing request.

Please add new claims 22, *et seq.*

22. (New) Electromagnetic signals propagating on a computer network, comprising:

said electromagnetic signals carrying instructions for execution on a processor for the practice of,

associating each vfiler with an IPspace having one or more addresses assigned to one or more network interfaces of the vfiler;

tagging each network interface with a first IPspace identifier (ID);

providing the vfiler with one or more routing tables that control routing operations for requests processed by the vfiler; and

applying the first IPspace ID to translation procedures that enable selection of a current vfiler context used to process an incoming request and an appropriate routing table used to process an outgoing request.

23. (New) A method for operating a server comprising:

configuring the server as a plurality of virtual servers, a virtual server of said plurality of virtual servers being an instance of the server;

associating each virtual server with a network address space, where different address spaces have overlapping addresses, each address space is associated with at least one network interface of the virtual server;

tagging each network interface with a first interface identifier (ID); and

applying the first interface ID to uniquely identify a client in the network address space requesting access to a virtual server of said plurality of virtual servers.

24. (New) The method of claim 23, further comprising:

using a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

25. (New) The method of claim 23, further comprising:

receiving a request at a receiving interface of the server; and

locating the virtual server in response to a the request and the first interface ID of the receiving interface.

26. (New) The method of claim 25, further comprising:

using a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

27. (New) The method of claim 26, further comprising:

determining a short cut for subsequent accesses and responses, in response to the first interface ID and the second interface ID.

28. (New) The method of claim 23, further comprising:

the address space is an IPspace.

29. (New) The method of claim 23, further comprising:

the interface ID is an IPspace ID.

30. (New) An apparatus for operating a server comprising:

the server configured as a plurality of virtual servers, a virtual server of said plurality of virtual servers being an instance of the server;

a network address space associated with each virtual server, where different address spaces have overlapping addresses, each address space is associated with at least one network interface of the virtual server;

a first interface identifier (ID) tagged to each network interface; and

an operating system that uses the first interface ID to uniquely identify a client in the network address space requesting access to a virtual server of said plurality of virtual servers.

31. (New) The apparatus of claim 30, further comprising:

a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

32. (New) The apparatus of claim 30, further comprising:

a receiving interface of the server to receive a request; and

a processor for locating the virtual server in response to a the request and the first interface ID of the receiving interface.

33. (New) The apparatus of claim 32, further comprising:

a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

34. (New) The apparatus of claim 33, further comprising:

the processor configured to execute the operating system to thereby determine a short cut for subsequent accesses and responses, in response to the first interface ID and the second interface ID.

35. (New) The method of claim 30, further comprising:

the address space is an IPspace.

36. (New) The method of claim 30, further comprising:

the interface ID is an IPspace ID.

37. (New) An apparatus for operating a server comprising:

means for configuring the server as a plurality of virtual servers, a virtual server of said plurality of virtual servers being an instance of the server;

means for associating each virtual server with a network address space, where different address spaces have overlapping addresses, each address space is associated with at least one network interface of the virtual server;

means for tagging each network interface with a first interface identifier (ID); and

means for applying the first interface ID to uniquely identify a client in the network address space requesting access to a virtual server of said plurality of virtual servers

38. (New) The apparatus of claim 37, further comprising:

means for using a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

39. (New) The apparatus of claim 37, further comprising:

means for receiving a request at a receiving interface of the server; and

means for locating the virtual server in response to a the request and the first interface ID of the receiving interface.

40. (New) The apparatus of claim 39, further comprising:

means for using a second interface ID to uniquely identify a context of the virtual server requested by the client, where the context is used to distinguish one virtual server from another virtual server.

41. (New) The apparatus of claim 40, further comprising:

means for determining a short cut for subsequent accesses and responses in response, to the first interface ID and the second interface ID.

42. (New) The method of claim 37, further comprising:

the address space is an IPspace.

43. (New) The method of claim 37, further comprising:

the interface ID is an IPspace ID.